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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/633,366	08/07/2000	In-Jung Lee	SAM-126	3947

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MILLS & ONELLO, LLP  
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BOSTON, MA 02108

EXAMINER

NGUYEN, CUONG QUANG

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/633,366

Applicant(s)

LEE ET AL.

Examiner

Cuong Q Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 5-13 is/are pending in the application.
- 4a) Of the above claim(s) 7-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_\_

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## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over  
Admitted prior art Fig1d in view of Chen et al. (US 6,033,950).

Admitted prior art Fig1d discloses a wire-bond attached chip capacitor (WACC) structure comprising: a lower electrode (10); a dielectric layer (14) formed on the lower electrode; an upper electrode (16) including a deposition structure comprises a doped polysilicon layer (16b) having a thickness of 2500 Å formed on a first undoped polysilicon layer (16a) with a thickness of 500 Å; an metal pattern (24) formed over the upper electrode.. See Admitted prior art's Fig1d.

Admitted prior art Fig1d does not teach that a second undoped polysilicon layer formed on the doped polysilicon layer.

Chen et al. disclose a capacitor structure comprising: an upper electrode including an undoped polysilicon layer (34) having a thickness between 540 to 600 Å formed on a doped polysilicon layer (32) to prevent out-diffusion from the lower doped polysilicon layer (32) during thermal cycles. See Chen et al.'s Fig.8 and col.2 lines 40-44.

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It would have been obvious to one of ordinary skill in the art to form an undoped polysilicon with a thickness less than 1000 Å on top of the doped polysilicon as taught by Chen et al. in order to prevent out-diffusion from the lower doped polysilicon layer (16b) during thermal cycles.

It is noted that, the device formed by the combination of Admitted prior art Fig1d and Chen et al. has the upper electrode including three layers: a doped polysilicon layer between first and second undoped polysilicon layers.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted prior art Fig1d in view of Chen et al. and further in view of Hanagasaki (US 5,767,541).

Admitted prior art Fig1d and Chen et al. teach all the limitations of claims 1-4 as shown above. However, these references do not explicitly teach that the metal pattern (24) over the capacitor structure formed as a laminated structure of Ti/TiN/Al.

Hanagasaki discloses a semiconductor device comprising: a metal pattern (13) formed over a capacitor structure, wherein the metal pattern is formed of Ti/TiN/Al. See Hanagasaki's Fig.1H and col.8 lines 48-56.

It would have been obvious to one of ordinary skill in the art to form the metal pattern (24) in Admitted prior art Fig1d's device of Ti/TiN/Al as taught by Hanagasaki because Al layer is very low resistance conductive material and Ti/TiN multi-layers are

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art recognized material for barrier layer which prevent the migration of metal layer into the substrate.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-3 and 5-6 have been considered but are not persuasive.

Applicants argue that the teaching of Chen et al. can not be incorporated into Admitted prior art's Fig1d because Chen et al. does not teach the capacitor is a wire-bond attached chip capacitor as claimed. In response, the WACC capacitor in admitted prior art's Fig.1d includes upper electrode, the capacitor of Chen et al. also includes upper electrode. So, the advantage of forming an undoped polysilicon with a thickness less than 1000 A on top of the doped polysilicon in upper capacitor electrode as taught by Chen et al. is also true in upper capacitor electrode of admitted prior art's Fig.1d. Therefore, it is reasonable for one of ordinary skill in the art to combine the teaching of Chen et al. into admitted prior art's Fig.1d.

### ***Conclusion***

3. **Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group**

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**2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.**

4. Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to CUONG Q NGUYEN whose telephone number is (703) 308-1293. The Examiner is in the Office generally between the hours of 6:30 AM to 5:00 PM (Eastern Standard Time) Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor TOM THOMAS who can be reached on (703) 308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722 or 308-7724.

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center Receptionists whose telephone number is 308-0956.



Cuong Nguyen

Primary examiner

June 18, 2003